Oregon
Theodore R. Kulongoski, Governor

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August 1, 2003

Tara Martich
EPA, Region 10
1200 Sixth Avenue
Seattle, Washington 98101

Re: Linnton Plywood Association Facility
10504 NW St Helens Road, Portland OR
ECSI No. 2351

Dear Tara:

The Oregon Department of Environmental Quality (DEQ) reviewed both historic and recent site information regarding the environmental conditions at the Linnton Plywood Association (LPA) facility in Portland. Based on our review, the Department concluded that the upland portion of the site has been adequately investigated, two small independent removals have been successfully completed, and the site is not a current source of contamination to Portland Harbor. DEQ therefore recommends that no additional source control actions are required at the site.

Please review the brief summary presented in the remainder of today's letter and Don Pettit's (DEQ project manager for LPA) attached July 31, 2003 memo titled "Staff Report for Completion of Pre-Remedial Investigation (Pre-RI)". Please complete your review and provide comments within 30-days of your receipt of today's letter. DEQ will consider all comments received prior to finalizing our decision regarding the site. DEQ expects that EPA will review and comment on our determination that the site is not a current source of Portland Harbor contamination. There are some outstanding environmental concerns at the LPA site that do not pose a threat to the river, but that must be resolved before DEQ proposes a "No Further Action" determination for the upland portion of this site.

Rationale for Source Control Decision

LPA completed a Pre-RI accomplishing the following objectives:

- Identify and characterize all upland hazardous substance source areas at the facility,
- Evaluate all contaminant migration pathways at the facility,
- Determine the nature, extent, and distribution of hazardous substances in affected media at the facility, and
- Identify all current and reasonably likely future human and ecological receptors at the facility.

After characterizing the facility, LPA conducted two small source area removals at Outfall 5 and the knife grinding debris pile. Approximately 10 cubic yards (cy) of contaminated soil/sediment were removed from the uplands at Outfall 5, and 8 cy of debris and soil were

removed form the knife grinding pile. Confirmation samples collected after the removals indicate the areas do not pose a threat to the river.

With the completion of the Pre-RI and the two small removals, DEQ does not consider the site to be a current threat to the river.

If EPA wishes to review any of the background documents related to this project, please contact me and I'll send them to you. The most important project background documents are listed on page 10 of Don's attached 7/31/03 memo.

If you have any questions regarding today's letter or any other issues, please contact me at (503) 229-6825 or anderson.jim@deq.state.or.us

Sincerely,

James M. Anderson
Cleanup & Portland Harbor

Attachments: Attachment 1- Don Pettit's July 31, 2003 memo titled "Staff Report for Completion of Pre-Remedial Investigation"

cc: Don Pettit, C/ER, DEQ
Mike Rosen, C/PH, DEQ
Fenix Grange, C/PH, DEQ

State of Oregon
Department of Environmental Quality
Memorandum

To: Mike Rosen, Manager
NWR Cleanup and Portland Harbor

Date: July 31, 2003

From: Don Pettit, NWR Cleanup and Emergency Response

Through: Jim Anderson, NWR Cleanup and Portland Harbor

cc: Terry Hosaka, Manager, NWR Cleanup and Emergency Response

Subject: Staff Report for Completion of Pre-Remedial Investigation
Linnton Plywood Association/Columbia River Sand & Gravel Facility
Portland, Oregon
ECSI – 2351 & 2373

The Oregon Department of Environmental Quality (DEQ) reviewed the Pre-Remedial Investigation (Pre-RI) conducted for the Linnton Plywood Association/Columbia Sand & Gravel facility located at 10504 NW St. Helens Road in Portland, Oregon. DEQ proposes no further investigation of potential upland sources of contamination to the Willamette River from the Linnton Plywood facility based on the information submitted for the Pre-RI. DEQ has determined that the Linnton Plywood site does not appear to be a current or ongoing source of Willamette River water or sediment contamination. This memorandum provides a summary of the Pre-RI information and a basis for a no further investigation recommendation for the upland portion of the site.

Background

The Linnton Plywood Association (LPA) facility is located at 10504 NW St. Helens Road in Portland, Oregon (Figure 1). The LPA site is approximately 26.5 acres, with the northern 16 acres used for manufacturing activities and the remaining portion sub-leased to Columbia River Sand and Gravel (CRSG) since 1994 (Figure 2 and Figure 3).

The entire subject property was initially developed by Clark and Wilson Lumber Company on properties acquired between 1905 and 1929 and was the site of a saw mill. Most of the site was used for storage of raw logs and finished products, with the mill located on the southern portion of the property. A fire destroyed the saw mill in 1947 and the site was used for storage until development of the plywood mill at the northern end of the property began in the early 1950s. LPA began site operations in 1951 under lease of the property and purchased the subject property in 1971 from the Spokane, Portland & Seattle Railway Company and Burlington Northern Railroad. LPA operated on the northern portion of the subject site until plant shut

down in December 2001. LPA manufactured plywood and used phenol-formaldehyde resin, sodium hydroxide, and petroleum hydrocarbons such as oil, diesel, and kerosene.

The area of the former Clark and Wilson Lumber Company saw mill was not redeveloped after destroyed by fire and remained unused until leased by CRSG in 1994. CRSG barges clean sand from the Columbia River to the LPA site for redistribution onto trucks. Water separated from the sands after off-loading is collected in several ponds at the site and discharged to the Willamette River under a National Pollutant Elimination System permit (NPDES Permit #101295) issued by the DEQ Water Quality Program.

In fall 1997, an investigation of sediments in a 5.6 mile stretch of the Willamette River (known as the Portland Harbor) was conducted by the DEQ and US-EPA. Three shallow samples and one deeper sample were collected from sediments adjacent to the LPA and CRSG site. Polynuclear aromatic hydrocarbons (PAHs) and heavy metals were detected in the samples.

In June 2000, LPA entered into a Voluntary Agreement for Department oversight of a Pre-Remedial Investigation (Pre-RI) to evaluate all potential current sources of contaminants to the Portland Harbor from upland sources. The objectives of the Pre-RI, as described in the June 2000 Voluntary Agreement, are to:

- Identify and characterize all upland hazardous substance source areas at the facility;
- Evaluate all contaminant migration pathways at the facility;
- Determine the nature, extent, and distribution of hazardous substances in affected media at the facility; and
- Identify all current and reasonably likely future human and ecological receptors at the facility.

The Pre-RI was not designed to evaluate all potential sources of contaminants at the LPA facility, nor does it reach conclusion with respect to risks to human health or the environment associated with pathways other than those having connection to the Willamette River and/or riverbank sediments.

Historical and Current Site Use Evaluation

Prior to beginning the Pre-RI, site history was reviewed, and an analysis of materials used or produced at the facility was conducted to determine whether potential contaminant releases have occurred that could have ongoing impacts to the Willamette River. Most site operations directly relating to manufacturing of plywood at the LPA facility occur within the four main conterminous buildings; the Gas Dryer Building, Steam Dryer Building; Green Veneer Building and the Pressing and Finishing Building.

Raw logs were typically stored along the waterfront pilings until processing began at the dock (Figure 2) where over/in-water activities included cutting off the ends of the logs, cutting to rough length for peeling, and loading them onto a conveyor to the "Green End". Over water work in this area potentially produced wastes (including machinery and transformer oils, metals, fuels, rubber, and organic debris from log handling) which were not a focus of this investigation; these historic operations ceased in 1992 when LPA began to import veneer sheets via rail and truck. This potential in-water source has been described to the EPA in previous direct and summary communications. Historically (until the switch to imported veneers), the Green End operations included peeling the logs using automated lathes. The waste material (bark) was conveyed to wood waste storage areas via overhead ducts until used to fuel boilers at the site.

Veneers were stored in the Green Veneer Building until ready for drying in the Steam Dryer and Gas Dryer Buildings. Phenol-formaldehyde glues are applied and the veneers are pressed in the Pressing and Finishing Room. The mixing and storage of glue was within a roofed containment area until piped into the Pressing and Finishing Room for application. Although no specific sources were identified, these areas were evaluated (see Risk Evaluation below) as potential current/historical sources of contaminants to the Willamette River via groundwater transport. Additionally, oils and greases (TPH) used throughout the facility, and metals associated with the former machinery operations are considered to be potential sources to the Willamette River through incidental transport via stormwater runoff (see evaluation and source control discussion below).

Other potentially active sources of contamination identified include the Maintenance Shop, Auto Repair Shop (and associated steam cleaning area/Outfall 5), Sander Dust Ash Disposal Area, the storage tanks associated with the Boiler House, and pole-mounted transformers. Potential sources of contamination to stormwater runoff included TPH associated with incidental releases of oils, greases, and fuels, PCBs due to releases from site transformers, and heavy metals from general site operations and roof runoff.

The Maintenance and Auto Repair Shops were considered potential sources of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and heavy metals to stormwater runoff, groundwater, and riverbank soils.

CRSG's use of the southern portion of the LPA facility is not considered a source of contaminants to the Willamette River. However, because of the lack of historical information on the southern portion of the facility, a screening evaluation of groundwater for SVOCs (and heavy metals at the northern part of this area where ash disposal occurred) was deemed appropriate.

Three underground storage tanks (USTs) used to store gasoline (4,000 to 10,000 gallon capacity) were decommissioned from a common excavation east of the Boiler House. Approximately 80 cubic yards of gasoline-impacted soil was removed with a maximum of 2.4 mg/kg of gasoline-range total petroleum hydrocarbons remaining in the excavation. A no further action determination was issued by the Northwest Region UST Cleanup Program on September 27, 1994. Although the USTs were not considered a potential source of

contaminants to the Willamette River, the area where the USTs were previously located were evaluated (for fuels and SVOCs) due to the presence of storage tanks associated with the Boiler House.

Source/COI/Pathway Identification

The key sources/pathways identified were riverbank soils in areas where disposal or discharges have occurred, the discharge of groundwater which may have been impacted by historic releases, and the transport of catch basin sediments and contaminated soil entrained in stormwater to the river via stormwater collection and discharge. The Chemicals of Interest (COIs) identified for the site based on our understanding of past and present site use, facility operations, and previous investigations (listed by their potentially complete pathway) are: TPH, PCBs, heavy metals, and SVOCs in catch basin sediment or soil entrained in stormwater runoff; and TPH, SVOCs, heavy metals, and volatile organic compounds (VOCs) in riverbank groundwater or soils.

A work plan was developed to assess these potential sources and pathways through the collection of soil, groundwater and catch-basin sediment samples. The results of the investigation are documented in the following reports: 1) February 2002 "Pre-Remedial Investigation Assessment Report"; and 2) the December 2002 "Enhancement Sampling for Pre-Remedial Investigation Report" prepared by CH2M Hill for the Linnton Plywood Association Facility, and are summarized below.

Site Investigation / Risk Evaluation

The site investigations carried out at the LPA facility, and the evaluation of potential risks, are discussed below based on their potential pathway to the Willamette River.

Evaluation of Potential Groundwater Pathway

Groundwater samples were collected in October 2001 from key areas along the riverbank based on the results of the historical site use evaluation (see Figures 2 and 3). The samples were collected using a temporary well screen installed with driven-point technique. Due to the presence of silt in the formation, sample volumes collected were limited, and non-turbid samples could not be collected from the temporary well screens. Groundwater samples were tested for site-specific chemicals of interest (COIs). Some samples collected during the October 2001 sampling event, without field-filtering, contained metals and phthalates concentrations slightly above applicable screening criteria (see attached Table 1 – Riverbank Groundwater Results). A second groundwater sampling event was conducted in October 2002, using field-filtered groundwater samples (collected adjacent to the Maintenance Shop, Steam Cleaning, Green End and Wigwam Burner) to determine whether sediment (entrained in un-filtered samples collected in 2001) may have biased the analytical results. Based on a comparison of the October 2002 groundwater data to the October 2001 sample results, the DEQ agrees with CH2M Hill's conclusion that elevated concentrations of some metals and

phthalates were biased high (by 1 to 2 orders of magnitude) due to the presence of sediment in the original samples. With the exception of a single sample (the duplicate sample collected at the Steam Cleaning Area), all samples collected in October 2002 contained copper, lead, and phthalates at concentrations either below the method detection limit or conservative contaminant screening values for ecological receptors in freshwater (DEQ Ambient Water Quality Criteria (AWQC) or Level II Ecological Screening Level Values (SLV)). The low concentrations of lead in the samples from the Steam Cleaning Area (1.61 ug/l and 4.12 ug/l in the duplicate) are only slightly above conservative screening values (DEQ Level II SLVs) for freshwater and are below typical background concentrations for inorganic contaminants in freshwater (13.3 ug/l; October 28, 2002 DEQ Memo - Default Background Concentrations for Metals) even before attenuation and/or dilution when mixing with surface water. Based on the evaluation of the groundwater pathway, contaminant concentrations documented in site groundwater are not indicative of an active source with the potential to negatively impact Willamette River sediment or water quality.

Evaluation of Potential Stormwater/Riverbank Soils Pathway

Initial samples of sediment were collected from site catch basins (associated with Outfalls 2, 3, and 3a) and from soil/sediment beneath stormwater outfalls (Outfalls 5 and 6) at the site in October 2001 (Figure 2). The samples were tested for site-specific COIs and were intended to provide information on the types of contaminants released at the active facility, and the maximum concentrations that could be contributed to river sediments via the stormwater pathway in the absence of any site controls. Initial sediment samples contained detectable concentrations of chromium, copper, lead, zinc, petroleum hydrocarbons, halogenated hydrocarbons, phthalates, polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (see attached Table 2 – Catch Basin Sediment and Outfall Soil Results). After receipt of the analytical results, LPA installed filters in all catch basins to reduce the amount of particulate passing through the system. Most contaminants are expected to decrease due to the shut down of LPA operations in December 2001.

Initial samples of Outfall 5 surface soils (at base of outfall discharge area) contained petroleum (primarily diesel-range hydrocarbons at 1,270 to 1,820 mg/kg), low levels of chlorinated hydrocarbons, and elevated metals. LPA proposed further evaluation of Outfall 5 after removal of visibly stained material (see Source Area Removals, below).

The soil samples collected at Outfall 6 (October 2001 and October 2002) to evaluate potential contribution via the stormwater pathway contained PAHs, cadmium, copper and lead at concentrations above DEQ Level II sediment SLVs and/or background concentrations for terrestrial soils. Sediment samples collected from Catch Basins 2, 3, and 3A contained copper above DEQ Level II sediment SLVs. Isopropyltoluene and toluene were detected at low concentrations in Catch Basins 3 and 3A. There are no ecological toxicity criteria to evaluate these compounds in a sediment matrix. PCBs were also detected at low concentrations, below the DEQ Level II sediment SLVs.

An attempt to collect sediment samples from Catch Basins 2, 3 and 3A was made in October 2002 to evaluate the effectiveness of stormwater treatment using catch basin filters. No

sediment had accumulated due to the regular maintenance of the catch basins and the cessation of site operations.

The sample collected adjacent to Outfall 6 in October 2001 was composed of buff-colored silt-sized fragments with moderate plasticity. This material was found in the Outfall 6 sediment and selected for sampling based on the fact that it appeared to be a waste product. The material was not representative of the bulk of the sediment in the vicinity of the outfall. Although the origin of the material is uncertain (Outfall 6 drains the north side of the LPA facility and several up-gradient properties), comparison to samples of waste media collected in October 2002 from the north side of the facility indicate the material may have originated from the boiler or air treatment scrubber. During an attempt to collect a second sample of the material at the outfall in October 2002, the material could not be located. A sample collected beneath the outfall contained PAHs and metals at concentrations approximately two orders of magnitude lower than the 2001 sample. However, these chemicals were still present, essentially at the screening level and/or background concentrations. It is unclear if this represents contamination which is residual in nature, after the bulk of the material observed in 2001 has been transported away from the riverbank, or contamination which is representative of a steady-state release of contaminants from the outfall. However, when compared to toxicity-based screening level values based on "probable effects concentrations" (PECs) [1], the residual or steady-state concentrations of contaminants in Outfall 6 sediments do not represent a threat to sediment quality in the Portland Harbor.

The LPA facility operates and conducts monitoring under a General Discharge Permit (1200Z) for the discharge of stormwater to the Willamette River. Although the runoff of stormwater from the LPA facility does not currently appear to be a threat at present, ongoing source control measures (catch basin filter maintenance and cleaning) will be necessary to protect sediment and/or water quality in the Willamette River, especially as the site is put back into productive use.

Other Potential Sources

During the process of completing the shut down of operations at the LPA facility, unused products and wastes were disposed at off-site disposal facilities. During this process, a pile of knife-grinding debris was discovered in a level area between the Green End and the riverbank in an area of overgrown shrubs. The pile was distinct in color/texture and appeared to have accumulated in place due to historic discharges from a pipe emanating from the Green End. The material was tested for heavy metals and TPH, and confirmed to be composed primarily of chromium and iron, with low concentrations of residual heavy oil. Although this material was not identified as having a direct pathway to the Willamette

[1] For contaminants in catch-basin sediment or riverbank soil which have a direct transport pathway to the Portland Harbor, but would likely be diluted/attenuated during transport, the DEQ recommends screening against "Probable Effects Concentrations" rather than "Threshold Effects Concentrations" such as those found in *Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems* by D.D. MacDonald, C.G. Ingersoll, and T.A. Berger; Archives of Environmental Contamination and Toxicology, Volume 39, p. 20-31 (2000).

River, the pile was removed during plant closure, and the residual contamination was evaluated due to the relative proximity to the riverbank (see Source Area Removals, below).

Through work performed to complete the remedial investigation at the Arco/BP Terminal 22T (Arco/BP 22T) facility located immediately south of the LPA facility, gasoline-impacted groundwater was discovered in the extreme southeast corner of the LPA site (in the area of the groundwater sample collected during the initial phase of evaluation – designated Clarke & Wilson (south) on Figure 3). Gasoline (and related constituents) has been documented in groundwater immediately adjacent to this area at the Arco/BP 22T facility, though at somewhat lesser concentrations. TPH-Gx contamination in groundwater at the southernmost portion of the LPA site (the CRS&G site) is not considered an on-site source of contamination at the LPA site because, at least preliminarily, it appears that the source of the contamination is likely from the adjacent Arco/BP 22T facility. Evidence supporting the preliminary conclusion that the source of the TPH-Gx contaminated groundwater at the southernmost portion of the LPA site includes

- This area would be expected to be in a hydrologically down-gradient position relative to the Arco/BP 22T facility, a bulk petroleum distribution facility.
- The purpose of the investigation which discovered the impacted groundwater was to complete the delineation of groundwater contamination known to exist from release(s) of gasoline at the adjacent Arco/BP 22T facility.
- Groundwater is contaminated by gasoline at the northeast corner of the Arco/BP 22T facility at concentrations of a similar magnitude as that found at the adjacent southeast corner of the LPA facility. A petroleum seep has also been observed along the northern portion of the seawall at the Arco/BP 22T facility indicating that mobile free product is present and may have migrated along a preferential pathway toward the LPA facility.
- There are no known potential sources or documented releases of gasoline on this portion of the LPA facility which has been used for exclusively for sand and gravel storage/ processing since 1994. Prior to 1994, this area had not been used since cessation of log storage after the destruction of the Clark and Wilson Lumber Company mill in 1947.
- Although the groundwater sample collected from this area (Clarke & Wilson South) in 2001 was not analyzed for VOCs or total petroleum hydrocarbons, no odors or staining were noted during drilling or water sample collection.

If new information indicates that the source of the recently identified gasoline impacted groundwater at the southeastern corner of the LPA facility is discovered to be from the LPA facility itself, then DEQ will require further investigation (of this source only) by LPA. Until and unless this happens, the DEQ will require that Atlantic Richfield (a BP affiliated company) continue to investigate the release and evaluate the need for source control to protect human health and the environment as a part of their ongoing remedial investigation. LPA will continue to provide site access for the purpose of investigating the nature and extent of the release and any required source control measures.

Source Area Removals

Source area removals were conducted by LPA for two distinct areas where wastes accumulated at the LPA facility: the knife-grinding debris pile and the Outfall 5 area.

Knife-Grinding Debris Pile

The knife-grinding debris pile was located beneath a small pipe outfall from the eastern edge of the pressing and finishing building (Figures 4 and 5). A distinct cone-shaped pile approximately 8 cubic yards in volume was present beneath the end of the pipe. When the material was tested for site-specific COIs, it was found to contain high concentrations of chromium and low levels of copper and lead. Through toxicity characteristic leaching procedure testing, chromium was found to be non-leachable and therefore it is not considered a characteristic hazardous waste under the Resource Conservation and Recovery Act. Diesel and heavy oil-range petroleum hydrocarbons were also detected in a sample of the material. The above-ground portion of the material was removed in 2002, and the remaining material was removed in May 2003. Confirmatory samples collected after removal of the pile were analyzed for metals (chromium, copper, and lead), semi-volatile organic compounds (SVOCs) and TPH-Dx. Diesel/oil range hydrocarbons were detected at low concentrations (128 mg/kg) in one of the two confirmatory samples, and metals and SVOCs concentrations in the confirmatory samples were below available sediment PECs and (Table 3).

Stormwater Outfall 5

Soil collected from the Outfall 5 area in October 2001 was found to have elevated metals (cadmium, chromium, copper, lead and zinc), chlorinated hydrocarbons including dichloroethene, tetrachloroethene (PCE), methylene chloride, and phthalates (Table 2). In May 2003, approximately 9 cubic yards of soil were removed by loosening the soil with a shovel and vacuuming the material to a truck (Figures 2 and 6). Confirmatory samples collected after removal of impacted soils were analyzed for SVOCs, volatile organic compounds (VOCs), metals (cadmium, chromium, copper, lead and zinc) and diesel-range petroleum hydrocarbons. Initial confirmatory samples indicated that with the exception of a single sample (sample OF5-2C located immediately beneath the outfall opening) all contaminant concentrations were below available sediment PECs. Sample OF5-2C contained a lead concentration of 244 mg/kg, approximately twice the sediment PEC of 128 mg/kg. Additionally, diesel/oil-range petroleum hydrocarbon concentrations varied between not detected and 2,010 mg/kg. However, neither VOCs nor SVOCs (typical risk-driving petroleum hydrocarbon constituents) were detected in any of the confirmation samples (Table 3). Furthermore, the sample testing 2,010 mg/kg of diesel-range petroleum hydrocarbons (sample OF5-6E) was collected 0.5 feet bgs, and since the excavation has been backfilled, this residual contamination is now below ground surface and unavailable for contact or transport.

A second round of excavation was performed in July 2003 to remove approximately ½ cubic yard of material directly beneath the outfall (Figure 7). A confirmation sample collected

after removal of the material had a lead concentration of 69.4 mg/kg, or approximately ½ the applicable sediment PEC.

Pre-Remedial Investigation Status and Recommendation

The Pre-RI was designed to identify and determine which environmental media and pathways are affected by site related hazardous substances. The Pre-RI included a review of the facility history and review of current facility conditions to assess potential past and present sources of upland contamination that poses a threat to the Willamette River surface water and/or sediment. The Pre-RI was not designed to evaluate all potential sources of contaminants at the LPA facility (e.g., those upland sources that do not have a complete contaminant migration pathway to the river), nor does it reach conclusion with respect to risks to human health or the environment associated with pathways other than those having connection to the Willamette River and/or riverbank sediments.

With the completion of the removals at the two small source areas (Outfall 5 soils and the knife grinding debris pile) the Pre-RI is considered to be complete. DEQ concludes that there are no longer any upland sources of contamination at the LPA site that threaten the river, and further investigation of currently active sources/pathways contributing contaminants to the Willamette River is not warranted. This conclusion is based upon an evaluation solely of sources and pathways which may have connection to the river, the current uses of the property (warehousing in building formerly used to produce plywood, and aggregate processing in southern portion of property), and presumes that continued action will be taken to control contaminant transport via the stormwater pathway by maintaining catch basin sediment controls.

DEQ will request EPA review and comment on the source control decision that the site does not contain active sources of contamination threatening the river. Potential historic releases from the LPA facility that may have impacted Willamette River sediment and/or surface water will continue to be investigated by the EPA.

Attachments:

Figure 1: Site Location Map
Figure 2: Site Features and October 2001 Sampling Locations for Linnton Plywood Facility
Figure 3: Direct-push Groundwater Sampling Locations on Former Clark & Wilson Lumber
Figure 4: October 2002 Sampling Locations for Linnton Plywood Facility
Figure 5: Knife-Grinding Debris Removal Area
Figure 6: Outfall 5 Soil Removal Area
Figure 7: Additional Removal at Outfall 5

Table 1: Riverbank Groundwater Results
Table 2: Catch-Basin Sediment and Outfall Soil Results
Table 3: Post-Removal Soil Concentrations

Documents Reviewed:

- July 2000 – *Pre-Remedial Investigation Work Plan for the Linnton Plywood Association* by CH2M Hill
- December 2000 – *Pre-Remedial Investigation Assessment Work Plan Addendum 1 – Historical and Current Use Review and Conceptual Site Model for the Linnton Plywood Association* by CH2M Hill
- April 2001 – *Sampling and Analysis Plan (Addendum to the Pre-RI Assessment Work Plan) for the Linnton Plywood Association* by CH2M Hill
- February 2002 – *Pre-Remedial Investigation Assessment Report for the Linnton Plywood Association* by CH2M Hill
- August 2002 – *Linnton Plywood Association Sampling and Analysis Plan* by CH2M Hill
- December 2002 – *Enhancement Sampling for Pre-Remedial Investigation for the Linnton Plywood Association* by CH2M Hill
- July 17, 2003 – *Summary of Outfall 5 and Knife-Grinding Area Removal Actions* – letter report by CH2M Hill
- July 23, 2003 – *Summary of Additional Outfall 5 Removal Action* – letter report by CH2M Hill

Documents Cited:

- December 12, 1997 – Contaminated Aquifer Policy – Guidance document by Oregon Department of Environmental Quality
- September 27, 1994 – No Further Action Determination for UST Cleanup at Linnton Plywood (26-94-019) by Oregon Department of Environmental Quality, UST Cleanup Program

Table 1 - Riverbank Groundwater Results

	Detected Analytes (mg/l)		
	Copper	Lead	Bis(2-ethylhexyl) phthalate
Maintenance Shop - 2001 (unfiltered)	0.0311	0.424	NA
Maintenance Shop - 2002 (filtered)	0.001U	0.001U	0.00001U
Steam Cleaning - 2001 (unfiltered)	NA	0.0178	NA
Steam Cleaning - 2002 (filtered)	0.00135	0.00161	0.00001U
Steam Cleaning - 2002 (filtered, duplicate)	0.00249	0.00412	0.00001U
Green End - 2001 (unfiltered)	NA	0.0064	NA
Green End - 2002 (filtered)	0.001U	0.001U	0.00001U
Wigwam Burner - 2001 (unfiltered)	0.0153	0.0151	NA
Wigwam Burner - 2002 (filtered)	0.00262	0.00149	0.00001U
Freshwater background concentrations*	0.001	0.0133	none
DEQ Ambient Water Quality Criteria freshwater chronic	0.012	0.0032	none
DEQ Level II SLVs for aquatic receptors in surface water	0.009	0.0025	0.003
NOAA SQuiRT freshwater chronic	0.009	0.0025	0.36
EPA MCLs for Groundwater	1.3	0.015	none
EPA Region 9 PRGs	1.5	none	4.8

* - Freshwater background concentrations from October 28, 2002 DEQ Toxicology Workgroup Memo: Default background concentrations for metals

Table 2 - Catch Basin Sediment and Outfall Soil Results (mg/kg)

Detected Analytes	Location						Screening Values (applied value in boldface)				
(values in boldface exceed screening criteria)	Catch Basin 2 October-01	Catch Basin 3* October-01	Catch Basin 3A October-01	Outfall 5* October-01	Outfall 6 October-01	Outfall 6 October-02	DEQ Level II Sed SLVs	Soil Bkgrd	Sediment Bkgrd	Threshold Effect (TEC)	Probable Effect (PEC)
Cadmium	1.4U	1.6U	1.5U	**7.7**	4.2	0.768	0.6	1	0.5	0.99	**4.98**
Chromium	23.8	21.1	18.2	67.3	3.88	31.8	37	42	30	43	**111**
Copper	111	**175**	**177**	**618**	ND	43.7	36	36	12	31.6	**149**
Lead	13.9	35.4	24.5	**241**	2.08	26.6	35	17	2	35.8	**128**
Zinc	12.1	33.1	16.5	**739**	NA	NA	123	86	53	121	**459**
TPH - Diesel	65.7	104	262	1,820	ND	25U	NS				
TPH - Heavy Oil	NR	NR	NR	NR	NR	605	NS				
Anthracene	2.35U	2.67U	2.55U	2.85U	**3.37**	0.028	0.057			0.0572	**0.845**
B(a)A	2.35U	2.67U	2.55U	2.85U	**3.88**	0.056	0.032			0.108	**1.05**
B(a)P	2.35U	2.67U	2.55U	2.85U	1.94U	0.05	0.032			0.15	**1.45**
B(b)F	2.35U	2.67U	2.55U	2.85U	2.08	0.052	NS				
B(ghi)P	2.35U	2.67U	2.55U	2.85U	1.94U	0.043	0.3				
B(k)F	2.35U	2.67U	2.55U	2.85U	1.94U	0.039	0.027				
Chrysene	2.35U	2.67U	2.55U	2.85U	**4.98**	0.084	0.057			0.166	**1.29**
Fluoranthene	2.35U	2.67U	2.55U	2.85U	**12.7**	0.138	0.111			0.423	**2.23**
Indeno(123)P	2.35U	2.67U	2.55U	2.85U	1.94U	0.037	0.017				
Phenanthrene	2.35U	2.67U	2.55U	2.85U	**20.6**	0.161	0.042			0.204	**1.17**
Pyrene	2.35U	2.67U	2.55U	2.85U	**15.6**	0.137	0.053			0.195	**1.52**
Total PAHs	NA	NA	NA	NA	**63.2**	0.825	1.61			1.61	**22.8**
Bis(2-ethylhexyl)phthalate	2.35U	2.63U	2.55U	**6.33**	1.94U	NA	**0.75**				
Benzyl butyl phthalate	2.35U	7.07	2.55U	2.84U	1.94U	NA	NS				
PCBs (Aroclor 1254)	NA	0.0192	0.0099	0.0086U	0.0061U	NA	0.007			0.0598	**0.676**
cis-1,2-DCE	0.0013U	0.0019U	0.0015U	0.0054	.0012U	NA	**5.76b**				
PCE	0.0013U	0.0019U	0.0015U	0.017	.0012U	NA	**0.280b**				
Methylene chloride	0.006U	0.0094U	0.0077U	0.009	.0012U	NA	**0.93b**				
Toluene	0.0013U	0.0765	0.0015U	0.0025U	.0012U	NA	**5.3b**				
p-Isopropyltoluene	0.0013U	0.0165	0.0026	0.0025U	0.792	NA	**NS**				

Soil and sediment background values for metals from October 28, 2002 DEQ Toxicology Workgroup Memo: Default background concentrations for metals.
Threshold Effects Concentrations and Probable Effects Concentrations from MacDonald, et al., 2000 - Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems.

* Sample is the maximum detected value of two samples for Catch Basin 3 (sample and duplicate) and four distinct samples for Catch Basin 5.

NA - Not Analyzed

NR - Not Reported by Laboratory

NS - No Standard Available

b - Screening Value from 12/01 DEQ Level II SLVs for Bioaccumulation

Table 3 - Post-Removal Soil Concentrations (mg/kg)

Detected Analytes	**Location**									**Screening Values** (applied value in boldface)				
(values in boldface exceed screening criteria)	**Outfall 5 (OF5-1W)** May-03	**OF5-2C** May-03	**OF5-3E** May-03	**OF5-4NW** May-03	**OF5-5SW** May-03	**OF5-6E** May-03	**OF5-7C** July-03	**Knife-Grinding Debris KG-1** May-03	**KG-2** May-03	**DEQ Level II** **Sed SLVs**	**Soil** **Bkgrd**	**Sediment** **Bkgrd**	**Threshold** **Effect (TEC)**	**Probable** **Effect (PEC)**
Cadmium	0.873	<.417	0.649	<0.446	<0.806	0.691				0.6	1	0.5	0.99	4.98
Chromium	21	20.2	13.5	11.1	12.6	26.2		13.6	10.4	37	42	30	43	111
Copper	64.5	116	42	49.5	25.3	132		40.1	16.3	36	36	12	31.6	149
Lead	40.8	***244***	35.8	88.8	41.4	49.8	*69.4*	6.44	5.15	35	17	2	35.8	128
Zinc	162	331	148	162	102	379				123	86	53	121	459
TPH - Dx	345	854	<25	92	<125	2010		<25	128	NS	NA	NS	NS	NS
VOCs	ND	NA	ND	NA	NA	NA								
Semi-VOCs*	ND	ND	ND	ND	ND	ND		ND	ND					

Soil and sediment background values for metals from October 28, 2002 DEQ Toxicology Workgroup Memo: Default background concentrations for metals.
Threshold Effects Concentrations and Probable Effects Concentrations from MacDonald, et al., 2000 - Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems.

NA - Not Analyzed

NS - No Standard Available

* - Semi-VOC detection limits below PECs

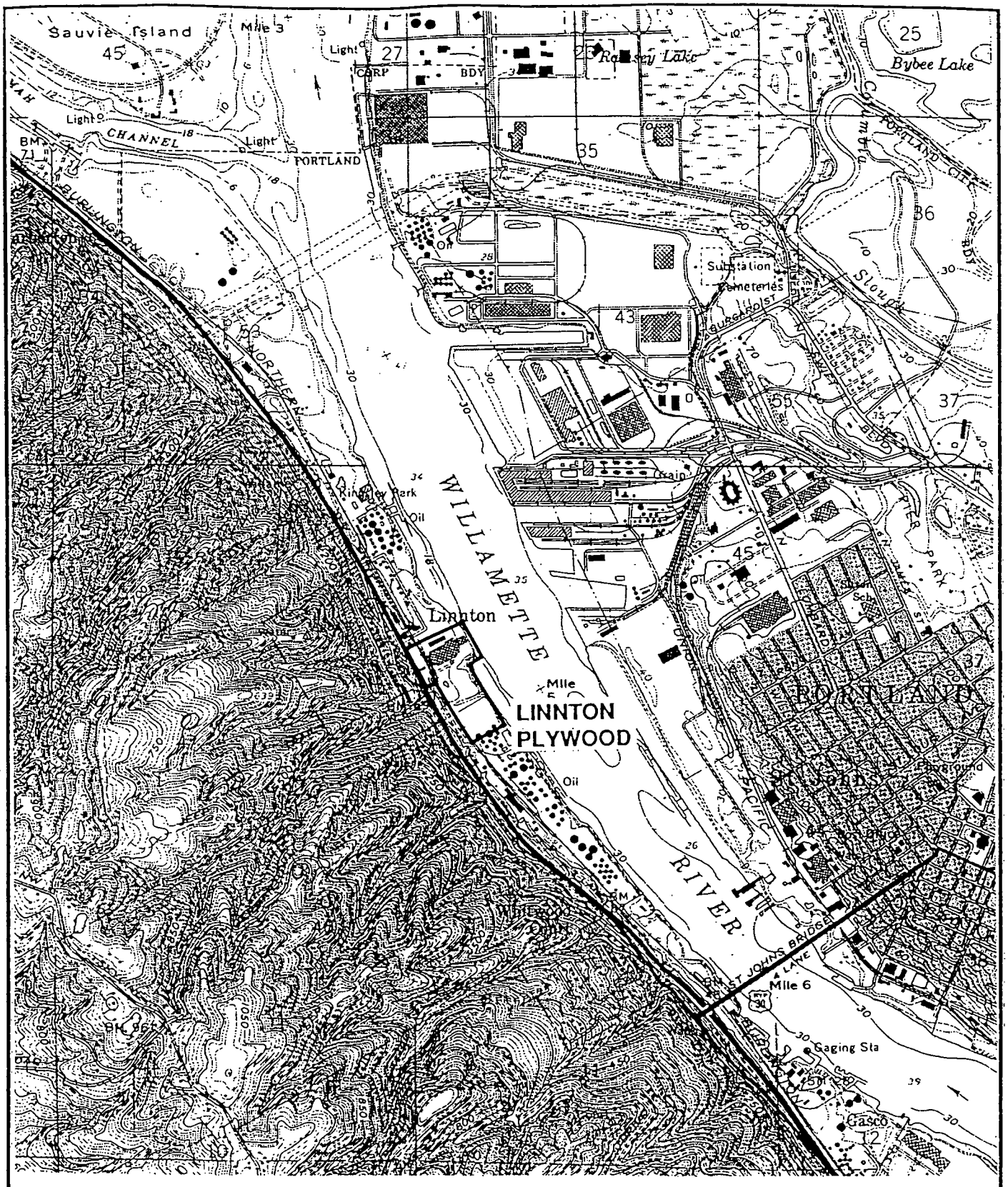
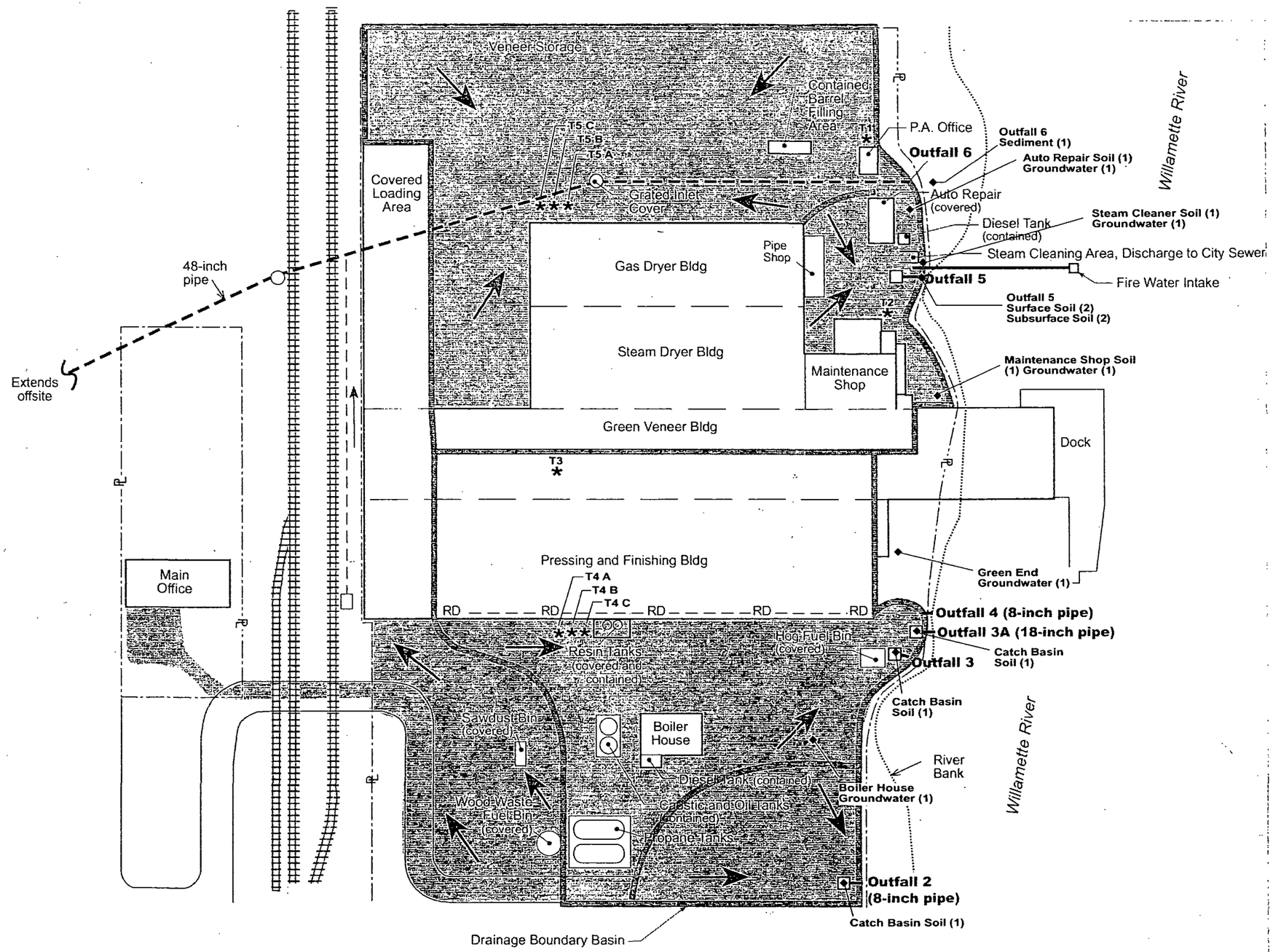


FIGURE 1
Site Location Map

LINNTON PLYWOOD ASSOCIATION
PORTLAND, OREGON

CH2M HILL



Columbia Sand and Gravel Operation

FIGURE 2
Sampling Locations
LINNTON PLYWOOD ASSOCIATION
PORTLAND, OREGON

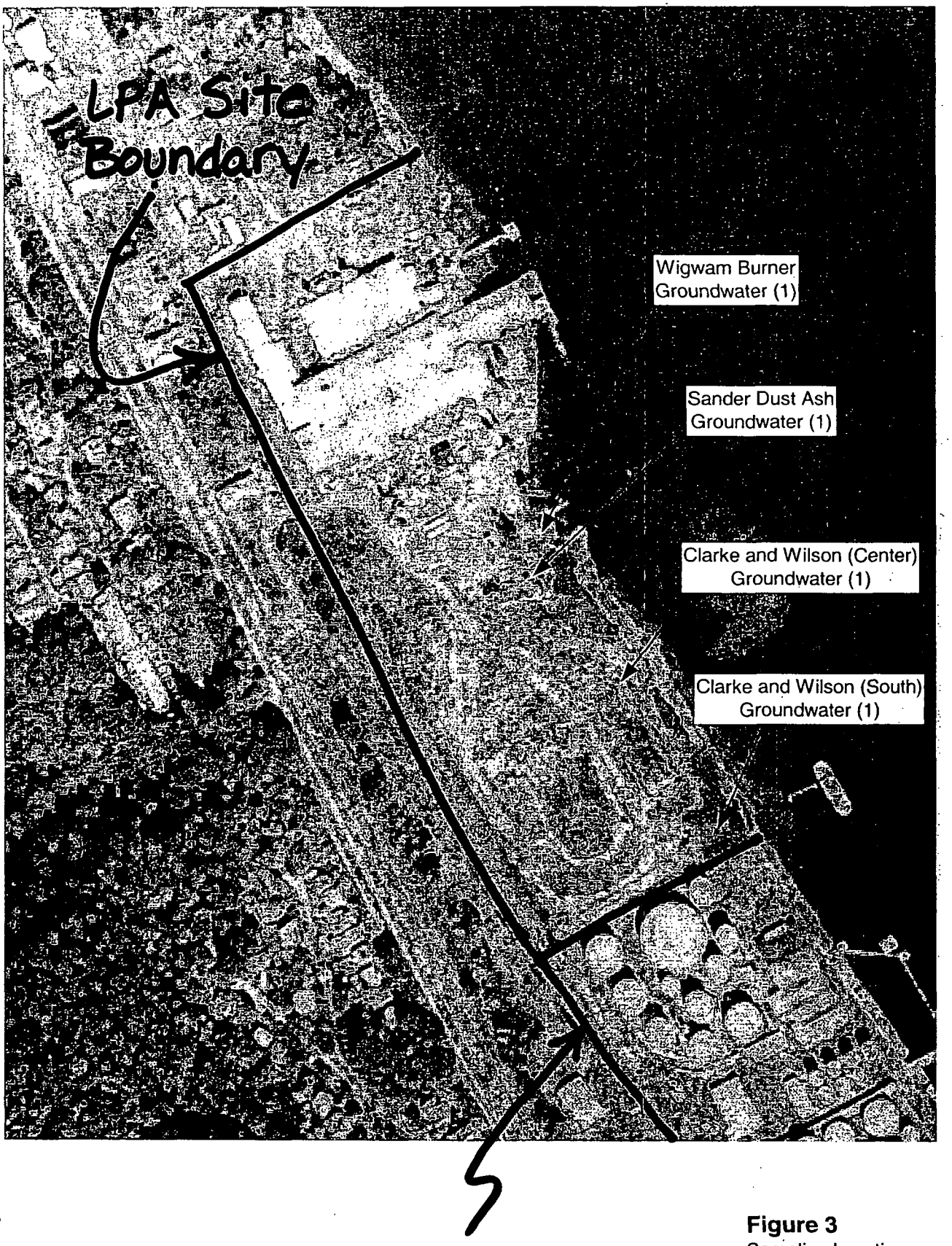


Figure 3
Sampling Locations
Linnton Plywood Association
Portland, Oregon

CH2MHILL

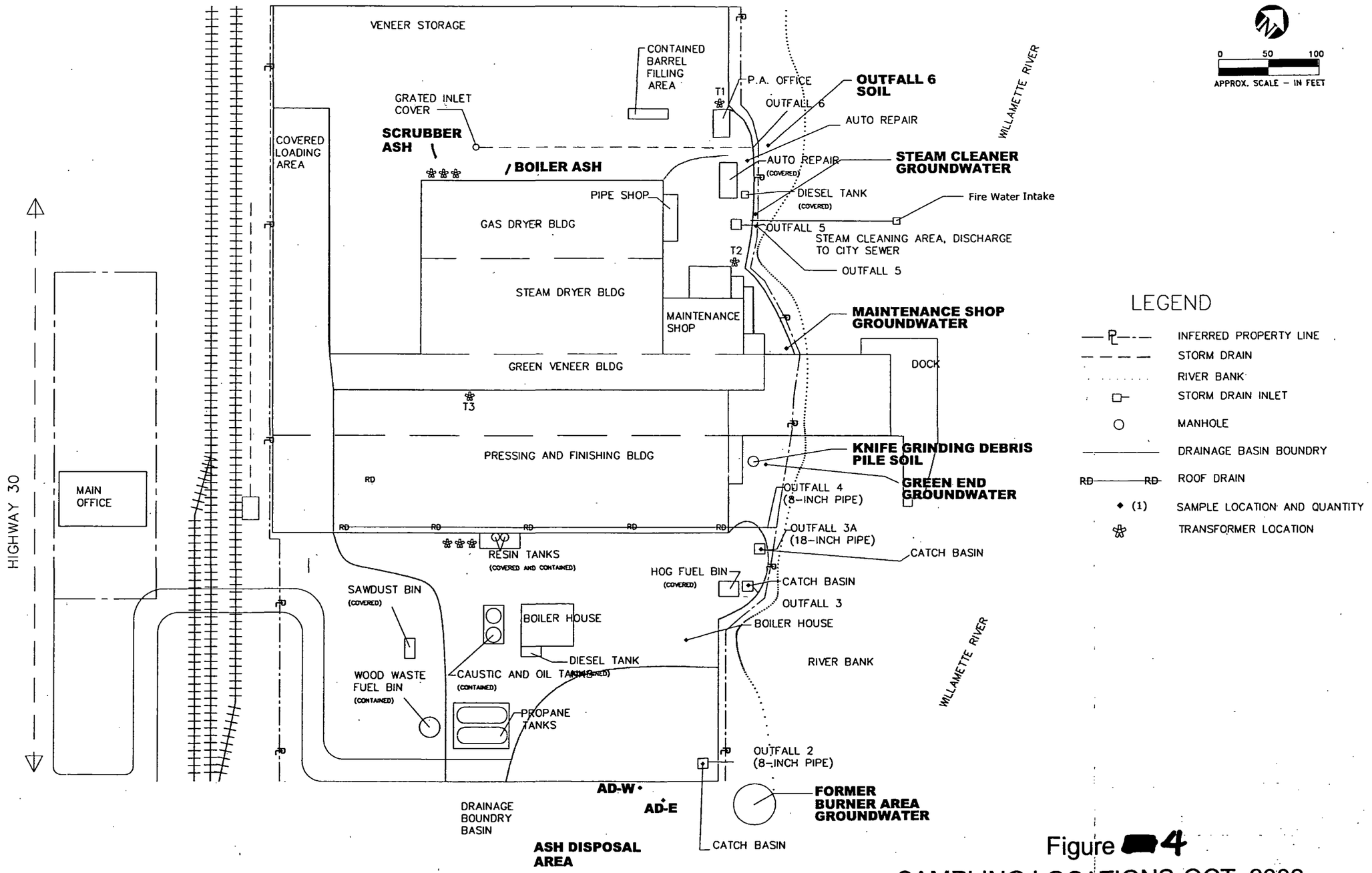


Figure 4

SAMPLING LOCATIONS-OCT. 2002

LINNTON PLYWOOD ASSOCIATION
PORTLAND, OREGON

CH2MHILL

SampLoc2.dwg

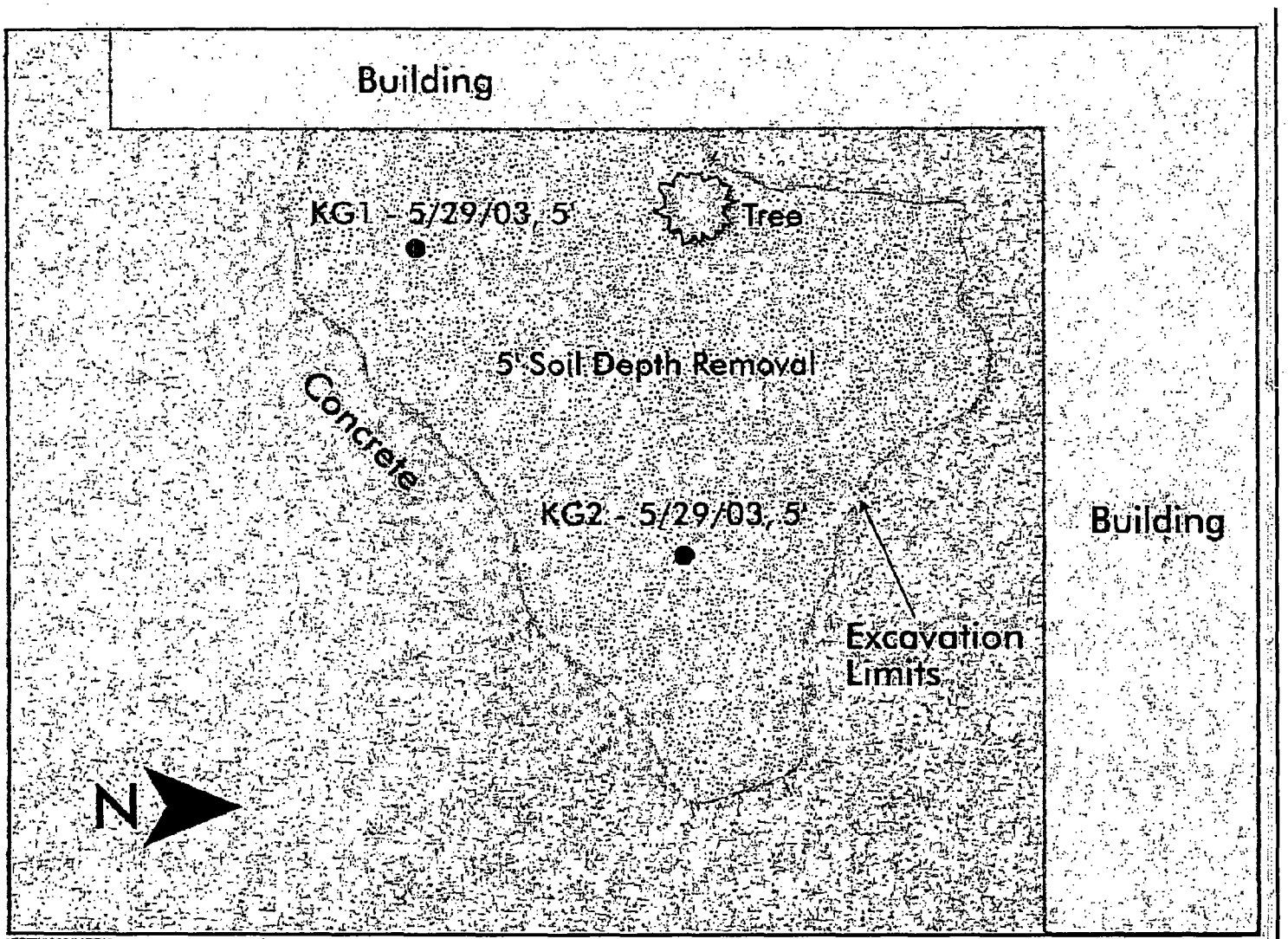
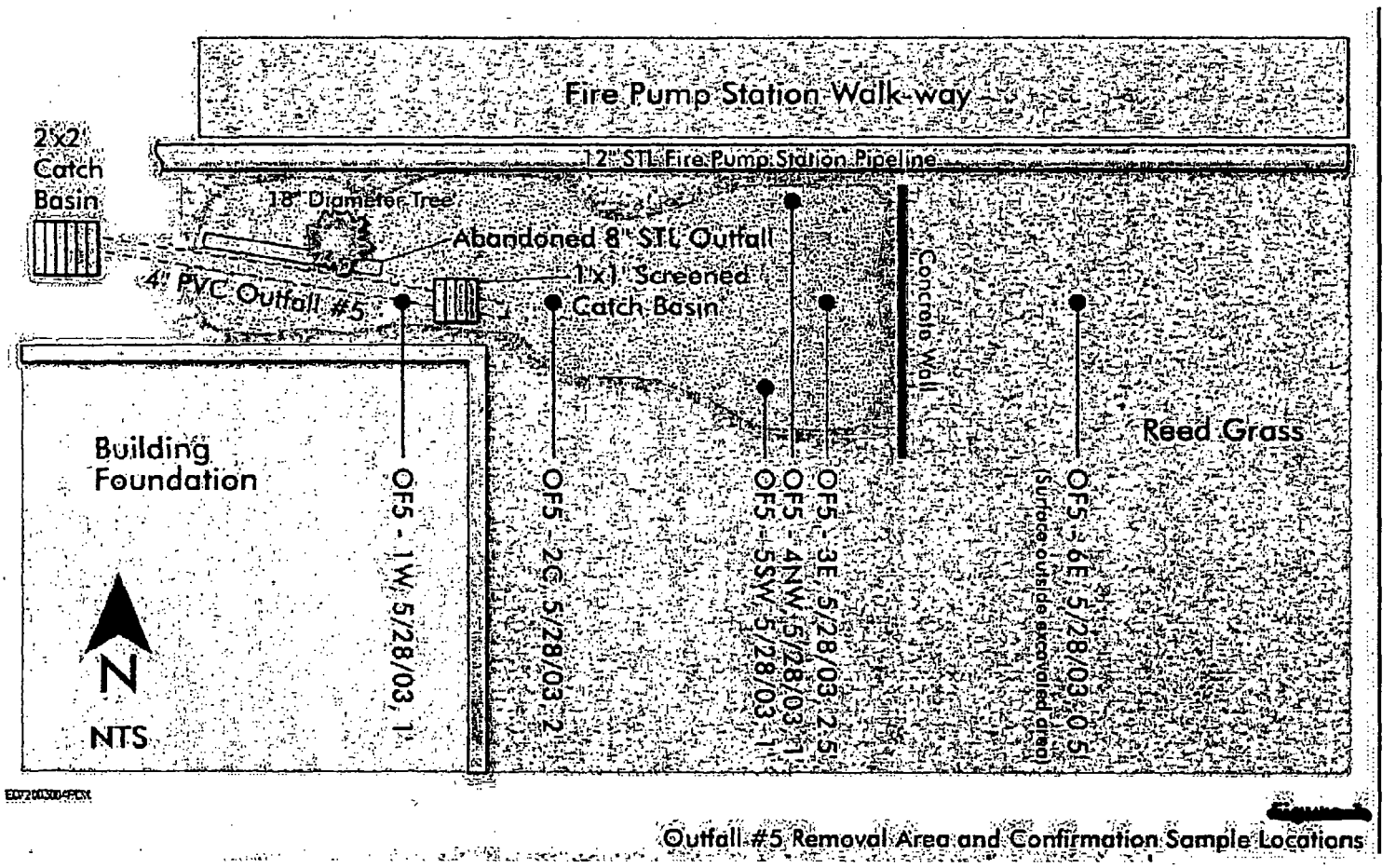
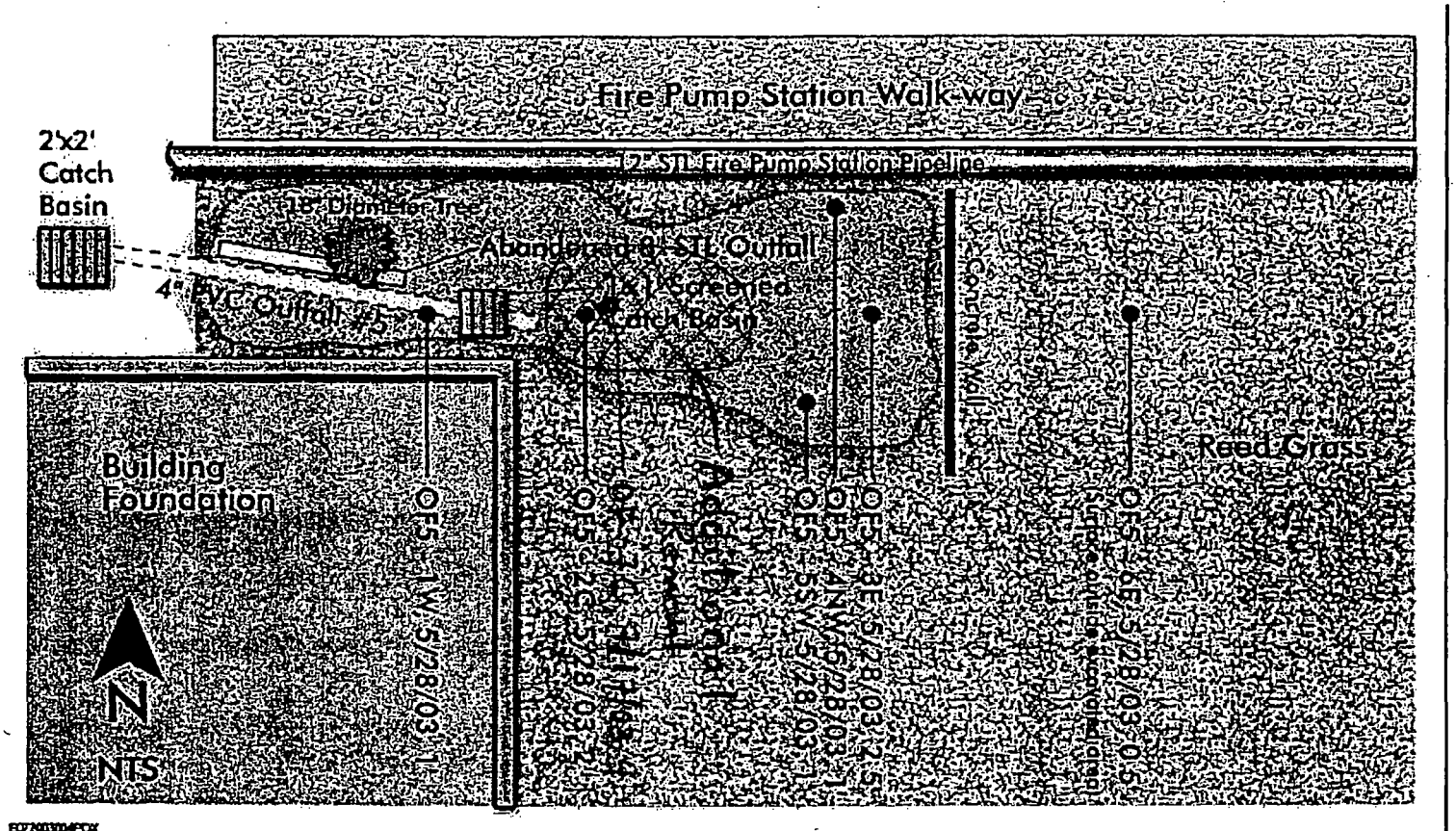

Building
KG1 - 5/29/03, 5'
Tree
5' Soil Depth Removal
Concrete
KG2 - 5/29/03, 5'
Building
Excavation Limits
N
ED72003004PDX
[redacted] Knife-Grinding Area
Soil Removal Area and Confirmation Sample Locations

Figure 5



Outfall #5 Removal Area and Confirmation Sample Locations

Figure 6



Outfall #5 Removal Area and Confirmation Sample Locations

Figure 7